AMENDMENTS TO THE CLAIMS

Claims 1 - 38 (canceled).

39. (previously presented) A method for manufacturing a magnetic memory element comprising:

forming a pinned layer with a magnetization in a first direction supported by a substrate;

forming a tunnel barrier layer adjacent the pinned layer; and

forming a sense layer adjacent a side of the tunnel barrier layer opposite the pinned layer, said sense layer having a first ferromagnetic layer and a second ferromagnetic layer mutually separated by a conductive spacer layer and a characteristic which results in stray field coupling and antiferromagnetic exchange coupling between said first and second ferromagnetic layers.

40. (previously presented) A method of claim 39 wherein the act of forming said sense layer further comprises:

forming said first ferromagnetic layer over the tunnel barrier layer;

forming said conductive spacer layer over the first ferromagnetic layer; and

forming the second ferromagnetic layer over the conductive spacer layer.

41. (original) A method of claim 40 further comprising smoothing a surface of the pinned layer before forming another layer on said pinned layer.

42. (previously presented) A method of claim 40 further comprising smoothing the first ferromagnetic layer before forming said conductive spacer layer.

43. (previously presented) A method of claim 40 wherein said first and second ferromagnetic layers are formed of a material comprising NiFe.

44. (previously presented) A method of claim 40 wherein said first and second ferromagnetic layers are formed of a material comprising CoFe.

45. (previously presented) A method of claim 40 wherein said first and second ferromagnetic layers are formed of a material comprising Co.

46. (previously presented) A method of claim 40 wherein said first and second ferromagnetic layers are formed of a material comprising Fe.

47. (previously presented) A method of claim 40 wherein said first and second ferromagnetic layers are formed of a material comprising Ni.

48. (previously presented) A method of claim 40 wherein said first and second ferromagnetic layers are formed of a material comprising NiFeCo.

49. (previously presented) A method of claim 40 wherein said conductive spacer layer comprises a Ru layer.

50. (previously presented) A method of claim 40 wherein said conductive spacer layer comprises a Cu layer.

51. (previously presented) A method of claim 40 wherein said conductive spacer is a conductor that is not ferromagnetic or antiferromagnetic.

52. (previously presented) A method of claim 40 wherein said conductive spacer layer is formed with a thickness such that the antiferromagnetic exchange coupling between said first and second ferromagnetic layers is less than the coercive (H) field value of the one of the first or second ferromagnetic layers which has the largest coercive field value.

53. (previously presented) A method of claim 40 where forming said layers is such that the layers are formed of a material and thickness sufficient to provide stray field coupling and antiferromagnetic exchange coupling, said antiferromagnetic exchange coupling is within the range of greater than 0 to <= 200 Oe between the first and second ferromagnetic layers across said conductive spacer layer.

54. (previously presented) A method of claim 40 wherein said step of forming the first and second ferromagnetic layers includes forming said first and second ferromagnetic layers including NiFe.

55. (original) A method of claim 40 wherein second layer is formed with a thickness t and first layer is formed with a thickness greater than t.

56. (previously presented) A method of claim 40 further comprising:

forming a thinner layer, relative to the first ferromagnetic layer, of Co interposed between the conductive spacer layer and the first ferromagnetic layer; and

forming a thinner layer, relative to the second ferromagnetic layer, of Co interposed between the conductive spacer layer and the second ferromagnetic layer.

57. (currently amended) A ~~sense layer~~ <u>method</u> of claim 40 further comprising:

forming a thinner layer, relative to the first ferromagnetic layer, of CoFe interposed between the conductive spacer layer and the first ferromagnetic layer; and

forming a thinner layer, relative to the second ferromagnetic layer, of CoFe interposed between the conductive spacer layer and the second ferromagnetic layer.

58. (previously presented) A method for manufacturing a magnetic memory element comprising:

forming a sense layer, said sense layer having a first ferromagnetic layer and a second ferromagnetic layer mutually separated by a conductive spacer layer and a characteristic which results in stray field coupling and antiferromagnetic exchange coupling between said first and second ferromagnetic layers across said conductive spacer layer;

forming a tunnel barrier layer adjacent the sense layer; and

forming a pinned or reference layer with a magnetization in a first direction adjacent a side of said tunnel barrier opposite said sense layer.

59. (previously presented) A method of claim 58 wherein the act of forming said sense layer further comprises:

forming said first ferromagnetic layer over the tunnel barrier layer;

forming a conductive spacer layer over the first ferromagnetic layer; and

forming the second ferromagnetic layer over the conductive spacer layer.

60. (previously presented) A method of claim 58 wherein said conductive spacer layer is formed with a thickness such that the antiferromagnetic exchange coupling between said first and second ferromagnetic layers is less than the coercive (H) field value of the one

of the first or second ferromagnetic layer which has the largest coercive field value.

61. (previously presented) A method of claim 58 where forming said layers is such that the layers are formed of a material and thickness sufficient to provide stray field coupling and antiferromagnetic exchange coupling, said antiferromagnetic exchange coupling is greater than 0 and <= 200 Oe between the first and second ferromagnetic layers across said conductive spacer layer.

62. (previously presented) A method of claim 58 wherein second ferromagnetic layer is formed with a thickness t and first ferromagnetic layer is formed with a thickness greater than t.

63. (previously presented) A method for manufacturing a magnetic memory element comprising:

forming a pinned layer with a magnetization in a first direction over a substrate;

smoothing a surface of the pinned layer;

forming a tunnel barrier layer over the pinned layer; and

forming a sense layer over the tunnel barrier layer, said act of forming said sense layer comprising:

forming a first magnetization layer over the tunnel barrier layer;

smoothing the first magnetization layer;

forming a spacer layer over the first magnetization layer;

forming a second magnetization layer over of the spacer layer;

said first and second magnetization layers and spacer layer being formed such that said layers are stray field coupled and antiferromagnetic exchange coupled across said spacer layer;

said first and second magnetization layers being formed such that said first layer has a magnetic saturation times said first layer thickness not equal to said second layer magnetic saturation times said second layer thickness.

64. (previously presented) A method of claim 63 wherein said spacer layer is formed with a thickness such that the antiferromagnetic exchange coupling between said first and second magnetization layers is less than the coercive (H) field value of the one of the first or second magnetization layer which has the largest coercive field value.

65. (previously presented) A method of claim 63 wherein sense layer is formed having antiferromagnetic exchange coupling between first and second magnetization layers of more than zero and less than a value which prevents magnetic orientation switching of said sense layer in the presence of an applied magnetic field.

66. (previously presented) A method of claim 63 wherein said first magnetization layer, spacer layer and second magnetization layer are formed of materials and and have thickness sufficient to provide stray field coupling and antiferromagnetic exchange coupling between

said first and second magnetization layers and across said spacer layer, said antiferromagnetic exchange coupling is greater than 0 <= 200 Oe.

67. (original) A method of claim 63 wherein the second magnetization layer is formed with a thickness t and first layer is formed with a thickness greater than t.

Claims 68 – 72 (cancelled).

73. (previously presented) A method for manufacturing a magnetic memory element comprising:

forming a pinned layer with a magnetization in a first direction over a substrate;

forming a conductive layer adjacent the pinned layer for creating a giant magnetoresistance effect; and

forming a sense layer on a side of the conductive layer opposite the pinned layer, said sense layer having a first and second ferromagnetic layers mutually separated by a conductive spacer layer and a characteristic which results in stray field coupling and antiferromagnetic exchange coupling between said first and second ferromagnetic layers.

74. (previously presented) A method of claim 73, wherein the act of forming said sense layer further comprises:

forming said first ferromagnetic layer over the conductive layer;

forming a conductive spacer layer over the first ferromagnetic layer; and

forming the second ferromagnetic layer over the conductive spacer layer.

75. (previously presented) A method of claim 73, wherein forming said layers is such that the layers are formed of a material and have a thickness sufficient to provide stray field coupling and antiferromagnetic exchange coupling, said antiferromagnetic exchange coupling is within the range of greater than 0 to <= 200 Oe between the first and second ferromagnetic layers across said conductive spacer layer.

76. (previously presented) A method of claim 73, wherein the second ferromagnetic layer is formed with a thickness t and the first layer is formed with a thickness greater than t.

77. (previously presented) A method of claim 73, wherein said pinned or reference layer is a synthetic ferrimagnet.